REMARKS

Claims 2-3, 8, 12, and 19-20 were rejected as indefinite. Applicant requests reconsideration. The claims have been accordingly amended. The term "identifier" was removed from the claims. In reading the claims, there are originating, proximal, distal, source, and destination caches, having respective URLs and IPA. To aid understanding and resolution, caches, URLs and IPAs are referenced.

Claims 1-4, 6, 8, 9, 11, 12, and 14-20 were rejected as unpatentable over Jordan in view of Garcia. Claims 7, 10, and 13 were rejected as unpatentable over Jordan in view of Garcia in view of Bertis. Applicant requests reconsideration. Applicant now responds to respective examination a-f comments.

a) The examiner states that claim 1 does not reference the tri-reference association. Anyone skilled in the art must realize that in order to send a message to a destination through the web, the destination IPA must be included. The tri-referenced information includes the originating URL, the source IPA, and the destination IPA. That is, the routing information sent must necessarily include the originating URL, the source IPA, and the destination IPA.

b) The examiner states that Jordan transmits routing information (such as source address, destination address, forwarding address, next hop address as disclosed upon request). What is strikingly missing from this list is the necessary originating URL.

c) The examiner states that transmitting to one destination is not broadcasting and that claim preambles do not limit the claims. If the preamble is not a limitation, then the reference to broadcasting in the preamble, respecting claim 1, seems misplaced. Surely the communication to one destination cache is a minimal, point-to-point broadcast, but a broadcast nonetheless. Claims 11 and 14 particularly claim repeating the communication, which perfects a wide-area broadcast. Also, the destination can build a forwarding and routing table from the receipt of a plurality of routing information. Broadcasting and table maintenance are the uses of the claimed tri-reference communication. Applications and uses are spelled out in the preamble, not as limitations, but as uses and applications. While uses and applications are not recited element limitations, they nonetheless go to obviousness, in that, the problem solved is relevant, to wit, building a URL-to-distal cache routing table through broadcasting. Hence, applicant's discussion as to obviousness and the problem solved brings in discussion of broadcasting for forming the distal routing table.

Applicant devised tri-reference routing information to solve the prior art problem. The tri-reference routing information communication is the solution, to solve the problem of distal table maintenance. It this regard, Jordan and Garcia have no commonality with which to arrive at the present invention. Communication of routing information by Jordan and the maintenance of table in Garcia are not related in any regard, and the combination of them does not suggest the invention in any regard. The examiner has simply taken isolated features and combined them based upon

forbidden hindsight reconstruction. Jordan does not communicate the tri-reference information. And Garcia does not receive the tri-reference information nor use tri-referenced communicated routing information to maintain tables.

d) The examiner first indicated that the claims do not recite a table. Hence, claims 19 and 20 were added. Applicant is claiming a method of communicating tri-referenced routing information that can be broadcast and that can be used to build routing tables in receiving distal caches. The examiner states that Garcia discloses broadcasting the routing update messages comprising routing information. Yet the examiner did not recite what exactly is that information, which particularly relates to Internet Protocol packet routing in the case of Garcia. Furthermore, Garcia does not communicate tri-referenced routing information that includes an originating URL. Both Jordan and Garcia do not communicate tri-referenced routing information and both particularly do not communicate the originating URL. Without source IPA, originating URL, and the destination IPA, combined as routing information, which may incidentally be wide-area broadcast and used to build routing tables, Jordan and Garcia cannot possibly suggest the claim inventions.

e) The examination's inability to recognize the invention, led the applicant to assist the examiner though the inclusion of claims 19 and 20 wherein the tri-referenced routing information is actually used to build routing tables. Prior to adding new claims 19 and 20,

routing tables were not claimed. Applicant will assist the examiner as necessary to fully gain understanding of the inventions and the prior art.

f) The terms hop, path, link, are well understood by those skilled in the art. There is no ambiguity.

The claims were rejected in part because the claims do not recite intended applications of the method steps for broadcasting associated routing information or recite arguments used in support of non-obviousness. These rejections are misplaced. The examiner states, on page 4, "In other words, the features upon which applicant relies, (as in applicant's arguments), are NOT recited in the rejected claims". This is a common perfunctory rejection often correctly used by examiners in anticipation rejections, but so often misplaced in the context of obviousness rejections.

In claim 1, applicant claims a method of broadcasting, which method is executed solely at the proximal cache, AND NO MORE. This claim clearly sets the reference perspective as being the proximal cache at the proximal IPA. As such, a potential infringer has to notice that a proximal cache, so broadcasting, that is merely broadcasting without regard to creating a forwarding and routing table at a destination, perfects the method and is covered by the claim. With this broadcasting method, a routing and forwarding table at the destination can then be maintained at a distal cache. As such, applicant claims the method of broadcasting only in so far as the execution is exclusively performed at the proximal cache.

There is no requirement that claim 1 also includes language as to the intended uses or applications of this broadcasting method or requirement that this claim claims the benefits of this broadcasting method, as the examiner incorrectly suggests. An obviousness determination is focused upon whether or not the claimed combination is obvious. The determination of obviousness goes to both the solution as in part claimed in claim 1 and the problem solved as stated in the argument. As to the solution in part, the combination of claim 1 has not been rejected as anticipated, but rejected for obviousness. Anticipation can be determined by an element-by-element comparison. Applicant did not address an anticipation rejection, where elements must be recited in the claims and not found in a single prior art reference. If applicant had argued that claim 1 was not anticipated because the prior art does not teach a destination routing table in combination, then the examiner's assertion would have been correct, and the routing table should be recited in the claims. However, the rejection is one of obviousness that brings into consideration a whole variety of related issues, such as, a long felt need without solution, and of course, the prior art problems solved. Surely, the examiner would not suggest that the claims must specifically recite the number of years that the prior art had such a long felt need, or necessarily recite the prior art problems solved, yet these two things do support a non-obviousness determination. Arguments that a claimed invention is not obvious need not be recited in the claims. It is simply enough that the combination not be anticipated, as indicated in the present record, and that the combination of claim

1, not be obvious. It is simply enough that the claimed broadcasting method steps in combination not be suggested, yet be useful. The reasons why a claim combination would not be obvious need not be recited in the claims. The examiner's basis for rejection because applicant's arguments are not found in the claims is without merit in the present obviousness determination context.

The claims are patentably distinct as written. New claims 19 and 20 add another step to claims 1 and 8 respectively of storing the association in the destination cache at the destination IPA, whereat a forwarding and routing table can be maintained. Hence, the use of the claimed combination of the broadcasting method of claim 1 then enables the creation of forwarding and routing tables at the destination IPA, and hence, enables the migration of routing information containing associations between URLs and source web cache IPAs subsequently stored as routing items in forwarding and routing tables at destination IPAs. Significantly, the claim 1 steps provide a method of broadcasting routing information that can then be used by other distal caches for accomplishing the migration of forwarding and routing tables. Claim 1 claims a broadcasting method and not the creation of forwarding tables as now claimed in new claims 19 and 20. Surely, this unanticipated and unobvious broadcasting method is of some value.

From a practical perspective, the examiner should realize that networks have distributed caches that can be manufactured by various entities. Claim 1 only covers a broadcasting cache that is the proximal cache, and hence, covers a necessary element to

forwarding and routing table migration within an entire network. Claim 1 covers a necessary novel core of the invention because, without this broadcasting of routing information, a distal forwarding and routing table cannot be maintained by a proximal cache. Hence, claim 1 focuses on a core point of novelty while providing clear notice of the scope of the claim. Other systems do have caches, and do have forwarding tables, and do have routing tables, but do not broadcast tri-referenced associated routing information. Hence, the focus of claim 1 is directed to a necessary point of novelty. The threshold point of novelty is the broadcasting of tri-referenced associated routing information. This broadcasting does not include process steps occurring at the destination cache, so that one can determine from claim 1, which caches within a network are covered by claim 1, and which ones are not. As such, the process steps of claim 1 are executed only at the proximal IPA, give clear notice as to what would infringe, and focus the examination of this case. This claim 1 strategy provides clear notice, covers a necessary point of novelty, and focuses this examination on to that the point of novelty, which is the broadcasting method of claim 1.

As such, the present invention of claim 1 serves to solve the problems of maintaining a network of cooperative caches through the migration of forwarding and routing tables by broadcasting tri-referenced associated routing information. The present invention solves the problem of routing table migration by broadcasting from a first proximal cache to a second destination cache at a destination IPA routing information that associates a URL-Id and a

third source IPA. These first, second, and third caches are clearly referenced in claim 1. The associated information includes a tri-referenced destination IPA, originating URL, and a source IPA. This association is recited in claim 1. Claim 1 is particularly recited, novel, unobvious, and useful.

The destination cache need not necessarily store the sought after web content data, but only maintain routing items that define where the web content data may ultimately be located through routing and forwarding, and ultimately stored among the cooperative caches. The web content data specified by the URL can be alternatively cached in and retrieved from a source cache for improved distributive web content data caching. As such, the present invention solves the problem of maintaining cooperative cache forwarding and routing tables by broadcasting tri-referenced associated routing information. The tri-referenced associated routing information including the URL, source IPA, and the destination IPA, can then be used to create a forwarding and routing table in any arbitrary distal cache, so as to migrate the forwarding and routing table information about the cooperative caches. This migration occurs without regard to load balancing, polling, frequency monitoring, or the mere transmission of URL requests from any one cache to another cache as in Jordan.

Applicant appreciates that many web features are found in various methods operating on various caches in cooperative systems, and that, the examination can become quickly confused if one is not careful to focus on the broadcasting steps of claim 1 in reference

to any sole proximal cache, as in Jordan. Applicant was well aware of this potential problem. To make the examination process as focused and as convenient as practicable, claim 1 is directed only to the minimal novel broadcasting steps executed by a single lone proximal cache, so that, operational steps by any other lone cache, such as in Jordan, can be quickly compared for novelty. Does this prior art reference, Jordan, teach or suggest a single cooperative proximal cache executing these tri-referenced associated broadcasting steps? This determination is limited in scope to aid in the examination process. When viewing Jordan, a like reference perspective to a "proximal cache" serves to quickly clarify the comparison and highlight the points of novelties.

That is, the examiner should compare apples to apples, and any lone cache in Jordan can be compared to the proximal cache of claim 1. However, because all of Jordan's caches operate in like manner, any one cache in Jordan may be used for comparison. In this regard, the migration and creation of forwarding and routing tables can be had through a unilateral tri-referenced associated broadcast communication from a broadcasting proximal cache as in claim 1. A distal cache can then use this broadcast communication for building a forwarding and routing table as recited in claims 19 and 20. For example, when the destination cache receives a URL request, the request can be routed and forward to the source cache and not the originating cache. As such, claim 1 and claim 19 highlight respective bifurcated functions for migrating forwarding and routing tables. Jordan relies on like caches whereas the proximal cache of claim 1 and the distal cache of claim 19 rely on a

cooperation between differently operating caches, yet another clear distinction between Jordan and the present invention.

Jordan teaches a load-balancing network of like cooperative caches that store web content data and maintain caching tables. Jordan does not solve the problem of migrating forwarding and routing tables about a network of caches. Jordan does not use the claim 1 solution of transmitting from a proximal cache to a destination cache tri-referenced routing information associating a URL with a source IPA of an alternative source storing or pointing to where the URL's web content data may be subsequently retrieved. In so doing, the invention of claim 1 serves to enable the migration of the forward and routing information about the cooperative distal caches that can then create forwarding and routing tables arbitrarily anywhere in the cooperative network.

Jordan teaches that when a cache is overloaded by a URL request, the URL request is directed to another destination at a destination IPA, so that the destination, that may store the web content data, can then function as a new alternative source. As such, the destination can retrieve the web content data, store it locally, and then respond to URL requests for the web content data so as to load share. As such, the destination and source are one in the same. Jordan does not solve the problem of migrating forwarding and routing tables among cooperative distal caches. Jordan does not suggests the invented solution of broadcasting to a destination distal cache tri-referenced routing information associating the

destination IPA with a URL indicating that web content data can be found in an alternative source cache.

In Jordan, a proximal cache at a proximal IPA receives a request for URL web content data from an originator or client browser. When the proximal cache at the proximal IPA is overloaded, the proximal IPA redirects the original request to a destination IPA also storing the web content data. The request is forwarded to a destination as an alternative source. The request contains an association between the requesting IPA and the URL of the originator originally firstly storing the requested web content data. Then, the destination cache stores the web content data to serve URL requests. The destination retrieves the URL web content data, stores it locally, and updates its caching table indicating it has stored this URL web content data. Jordan teaches load sharing. Jordan does not teach a method of broadcasting tri-referenced routing information, including an association between URL-Id and an alternative source of the URL-Id web content data and a destination, but rather directs the URL request to an unloaded server storing the sought after URL data. Jordan does not teach a method of broadcasting an association of a source with a URL to an arbitrary destination that can then construct and maintain a routing and forwarding table.

Jordan teaches a load-balancing web content data caching system that maintains a logical central directory for locating where requested web data is stored, preferably in the least loaded cache. (Col 7 lines 60-65). In Jordan, there is a guarantee that the owner

indicated in the directory does store the sought after web content data. By contrast, the present invention makes no such guarantee, as the routing information merely provides a direction through which a request could be forwarded or routed until a source cache is eventually reached that does store the sought after web content data specified in the URL request. The broadcasting of claim 1 provides the routing information, including the destination IPA, the URL, and the source IPA, and not the web content data.

The present invention provides for the broadcasting of routing information from a proximal IPA. The routing information at the proximal cache at a proximal IPA location is a tri-referenced association associating the destination cache at a destination IPA, and a source cache at a source IPA, and the URL. The associated URL request for web content data originally provided at a originating URL IPA is an implied fourth location. The physical locations are the proximal IPA, source IPA, the destination IPA as particularly stated in claim 1, while a fourth location of the original URL IPA location is also inferred. This specifically required tri-referenced association of the destination IPA, source IPA and URL, as recited in claim 1, is essential to understanding the novelty of claim 1 that then enables the migration of forwarding and routing tables. The destination IPA, originating URL, and source IPA association includes routing information associating a source IPA and the URL during broadcasting, which then enables the building of a forwarding and routing table at the destination distal IPA. Jordan does not have this tri-referenced association or the capability of migrating forwarding and routing information through

unilateral broadcasting. Jordan does maintain a caching table, which can be used to forward URL requests. However, the caching table is not maintained by virtue of receiving unilateral broadcast tri-referenced associated routing information. The caching table is not maintained by virtue of receiving unilateral broadcast routing information because, in Jordan, at least two of the claimed tri-referenced IPA locations, if not all three, are the same locations. In Jordan, the source and destination are one in the same, which receives a request, retrieves the URL data, updates its caching table, and becomes the alternative source, and hence, the limitation to only caching tables indicating exactly where is stored the requested web content data.

In view of the abstract of Jordan, a "request" indicating a requester at a requester IPA and indicating the "object", that is the requested URL web content data, is "forward" directly to another cache, so that the "requests" are shifted, that is, forward to another cache also storing the sought after web content data. Jordan does not use routing in any regard, as the examiner incorrectly suggests. Jordan migrates web content data and forwards requests when overloaded. Jordan's shifting by forwarding requests perfects load balancing among caches. As such, Jordan maintains a directory as a correctly named caching table of all caches storing the sought after web content data for forwarding when overloaded. That is, all of Jordan's caches are merely source caches sharing loads by forwarding requests. There is a difference between a caching table and a forwarding and routing table. A caching table points directly to alternative source caches having the stored

data. A forwarding and routing table points to another location that may or may not have the stored data, but ultimately indirectly points through a path along which a request is routed and forwarded, hopping from one cache to another, to where the data may be ultimately found. When a proximal cache is overloaded in Jordan, the proximal cache sends the URL request, which is not used as routing information, to an alternate cache location, at an alternate destination. (See Figure 3) As such, each proximal cache monitors the frequency of the requests, and if overloaded, each proximal cache searches its caching table directory to find other caches storing the same web content data, and forwards the request to the alternate source cache. In this manner, load balancing and web content data sharing is achieved.

Jordan forwards a URL request to a destination source cache, being both a destination and a source. Each cache in Jordan is a proximal cache, a destination cache, and ultimately a source cache, each maintaining a respective like caching table. The communicated URL requests or polling inquiries are simply not routing items having a tri-referenced association between a destination IPA, a source IPA, and a URL enabling a migration of forwarding and routing tables. The polling in Jordan is a bilateral communication, and not a unilateral communication. Jordan does not communicate from one proximal cache to a destination cache indicating that data is available through, but not necessarily at, yet another source cache. Jordan's caches do inquire through multicast polling where the information is stored for maintaining the caching table. When stored at the destination, the proximal overloaded cache sends the

URL request to the destination to load share. In Jordan, there is no tri-referenced associated routing information broadcast from a proximal cache to a second destination cache indicating a direct forwarding or indirect routing path to where the web data is stored on a third source cache. In Jordan, there is no routing information whatsoever, but rather, mere requests to send web content data to a requester or polling inquiries. In Jordan, an overloaded proximal cache searches its caching table directory, and then communicates and forwards the request from a proximal cache to a distal destination also serving as an alternative source cache. As such, Jordan does imply operation among three locations including a requester, an overloaded cache, and an underloaded cache. The operation in total does involve three locations, a requester, a proximal cache, and a destination source cache. However, the information consists of mere requests, inquiries, and does not point directly or indirectly to yet another third alternative source cache of the web content data. In Jordan, the destination and source are one in the same. The requests may be also used as the inquiries as to whether or not the web content data is stored at a distal cache. Hence, Jordan's communicated information is different. For maintaining the caching table, Jordan's information may include URL requests, the requester, and the destination, but not URL requests, the destination, and another source. The polling inquires would not include the alternative source as with the tri-referenced associated routing information of claim 1. Jordan provides for mere URL requests or inquiries, whereas the present invention broadcasts actual tri-referenced routing information. The information is different, and hence, Jordan does not anticipate,

and information communicated ultimately serves different purposes, such as load sharing using caching tables as opposed to routing information migration, and hence, the arguments as to nonobviousness. Jordan solves the problem of load balancing using forward requests, polling inquires, and caching tables whereas the present invention solves the problem of migrating routing tables and does so by broadcasting tri-referenced associated routing information. With different problems solved, different objectives, and different solutions, Jordan does not remotely suggest the present invention.

Specifically comparing apples to apples, Jordan teaches multicasting where a cooperative cache multicasts URL requests or inquiries to other caches. (Col 8 line 1) These URL requests may function as simple inquiries, such as, "do you have this information", and the answer may be "yes," indicated by merely sending the web content data in response. In so doing, each cache polls the remaining caches to maintain the caching tables. Jordan maintains a caching table by polling caches through bilateral bi-referenced communications. The present invention broadcasts unilateral tri-referenced routing information, so that, distal caches can maintain routing and forwarding tables. Jordan bilaterally multicasts bi-referenced unassociated inquires to maintain caching tables in proximal caches. The present invention unilaterally broadcasts tri-referenced associated routing information for maintaining forward and routing tables in distal caches. The two processes are completely different serving different objectives for solving different problems.

Jordan is clear and teaches load balancing. "Direct requests 155 are sent from the clients ... to cache server". (Col 5 line 55) "If an actual load imbalance is identified ... the load monitor initiates a shifting of forwarded requests from the overloaded cache to ... less loaded servers". (Col 6 line 3) "if the owner is currently overloaded ... the load monitor finds an underloaded cache ... and assign it as the new owner of the requested object". (Col 6 line 63) "The ownership information for the object in the caching table is updated". (Col 6 line 64). "The request can be forward ... to the new owner". (Col 7 line 3)

The examination states that Jordan's request includes source address, destination address, forwarding address, next hop address, as disclosed in the request to an arbitrary cache or destination upon a cache miss wherein the new entry is created for the object in the caching table a routing or forwarding table (Col 6 L50-67, and Fig 2a).

Is that really so? A search of specification reveals that the term "HOP" is not found at all. A search of the summary and preferred embodiment reveals that the term "route" is not used at all. Yet, to the examiner, it is apparently clear from these apparent phantom words. Within this cited text, none of these terms are mentioned at all, yet, this section is cited as the basis of the rejection. This is remarkable. Applicant appreciates that the technology is complex and involves many caches at many different locations serving different uses while communicating different

types of information. Nonetheless, precise and careful reading is required to fully understand the differences between Jordan and the present invention.

The caching table shown in Fig 2a of Jordan includes objects (the URL) and "Ownership" that is, the caches A, B, C storing the web content data. Such specific A, B, and C caches are not arbitrary, as indicated by the examiner, but indicate exactly where the data can be found and exactly where the request can be forwarded for load balancing and sharing. It appears the examiner reads more in Jordan than what is really there.

The plain full text does not read as the examiner indicates. "FIG. 3 shows an example of a logic flow for steps taken by the load monitor 120 in response to a request 125 from a cache server 150 because of a cache miss. As depicted, in step 201, it checks to see if the requested object/partition can be found in the caching table. If not, in step, 202, a new entry is created for the object/partition and a cache server is assigned as its owner. After the entry is located in the caching table, in step 203, the forwarding frequency 1011 is updated, e.g., incremented by 1. The load monitor then examines the load table 102 to see if the owner is currently overloaded (and that the forwarding frequency 1011 is a significant contributor thereto), in step 204. If yes, in step 205, the load monitor finds an underloaded (or less loaded) cache server and assign it as the new 10122 (or shared) owner 10122 of the requested object. The ownership information 1012 for the object in the caching table 101 is updated accordingly. Those skilled in

the art will appreciate that the logic flow could comprise a shared 10123 or hierarchical ownership 1012 in the caching table 101 or other data structure employed. The request (possibly with a copy of the requested object) can then be forwarded 125 to a new sole 10122 (or shared 10123) owner, in step 206. Alternatively, the new owner can be requested to obtain 115 an object copy from the originating object server, e.g., via the Internet 110." (Col 6 lines 50-66).

As such, the examiner incorrectly cites a specific section of text standing for the proposition that "On the other hand, Jordan, in its clear context, explicitly teaches the process of transmitting routing information, (such as source address, destination address, forwarding address, next hop address, as disclosed in the request) to an arbitrary cache or destination upon a cache miss, wherein the new entry is created for the object in a caching table, or routing or forwarding table." In discussing Jordan, "in its clear context", the examiner uses the terms such as "source address", "destination address", "forwarding address", "forwarding table", yet a simple cursory examination of the cited text upon which the examiner relies, teaches no such things nor uses any of these terms. Where are these terms in the cited text? How possibly could one make this apparent leap, but through some kind of tortured reasoning? These terms used by the examiner are not in the cited text, nor suggested in any regard, yet asserted by the examiner, as "clear". This is remarkable. The record of the present prosecution is becoming so distorted by the examiner's unsupported assertions, that this record is quickly becoming, in and of itself, a strong indicator of nonobviousness.

Jordan should be viewed from the exclusive perspective of a lone proximal cache, as dictated by the structure of claim 1 of the present invention. Jordan multicasts different information, that may be simple URL requests indicating a requester and the URL to a source of the URL data. This is opposed to broadcasting routing information associating an alternative source and a URL with a destination IPA, which does not even request the URL data. In Jordan, the URL request is communicated to a different location, that is, directly to a source of URL web content data for retrieving the URL content data. This is opposed to communicating to a destination cache that merely receives the routing information indicating an alternative source, which communication can then be used to build a forwarding and routing table. Jordan solves a different problem that is one of load balancing among like caches. This is opposed to solving the problem of migrating routing information for the purpose of building routing and forwarding tables in different arbitrary distal caches. With all kind due respect, Jordan does not remotely suggest the prevent invention.

Jordan multicasts polling bi-referenced inquiries from a proximal cache to destination caches that affirmatively respond in bilateral communications for maintaining a caching table in the proximal cache, which caching table is then used for forwarding URL requests to those destinations storing the URL data when a URL request frequency at the proximal cache is high for load balancing.

The present invention of claim 1 broadcasts from the proximal cache to destination caches tri-referenced routing information in a

unilateral broadcast communication, where the routing information associates a source IPA with stored originating URL data or stored additional routing information to a source of stored URL data along with the destination IPA, so as to enable the maintenance of forwarding and routing tables in the destination caches as in claims 19 and 20.

Jordan relies on like caches all with like caching tables and with like frequency monitoring, whereas the proximal cache of claim 1 and the distal cache of claims 19 or 20 rely on a cooperation between differently operating types of caches. Jordan does not suggest such a bifurcated cache function. The present invention is not required to poll other caches. The present invention does not require load monitoring. The present invention does not require multicast bilateral communications. The present invention does not maintain limited caching tables restricted to a few caches for simple load sharing only among them through forwarding URL requests. The present invention enables the building of generalized routing and forwarding tables in arbitrary destination distal caches regardless of what web data is stored on the distal destination caches. The present invention enables cooperative caching about a network of cooperative caches without regard to the frequency of URL requests at any one cache. Jordan does not have these benefits. The alternative distal source cache may store and source the URL web content data through directed forwarding requests or the alternative distal source cache may indirectly point through hop routing to yet another more remote distal alternative source cache storing the URL web content data, as

indicating the equivalence between forwarding and routing, enabling any number of routing hops to locate the sought after web content data stored in any one of any number of cooperative caches disposed anywhere within a network. The present invention is a significant advancement in the art and enables a comprehensive generalized network-wide distributive caching solution.

The cited references do not teach or remotely suggest broadcasting of tri-referenced associated routing information from a proximal cache to a destination distal cache, with the routing information associating URL web content data at an originating URL with an alternative distal source cache. The tri-reference routing information minimally includes: 1) Source IPA (where the web content data is cached); 2) Origination URL (identifying the original web content data); 3) Destination IPA (where the source IPA and Originating URL association are communicated for building at the destination IPA routing and forwarding table that directly or indirectly point to the URL web content data at the source IPA). The proximal IPA is a fourth bit of routing information. However, sometimes the proximal cache and the source cache are one in the same. When the destination cache receives this routing information, associating the original URL with the source IPA, a routing can be created in the destination cache associating the source IPA with the originating URL, so that, when a URL request is received by the destination cache, the destination can forward (or reroute) the request using the association between the request's URL to the source IPA, rather than the originator at the originating IPA originally storing the web content data indicated by the

originating URL. Hence, the tri-referenced information can be used to build a routing table in a destination cache. When the proximal cache at the proximal IPA broadcast the routing information to many destination caches, the network of cooperative caches can each build a forwarding and routing table for improved web communications. Such broadcasting of this specific tri-referenced associated routing information then enables the maintenance of forwarding and routing tables in arbitrary destination caches for forwarding and routing URL requests about a network of cooperative caches. Allowance of the claims is requested.

Respectfully Submitted

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